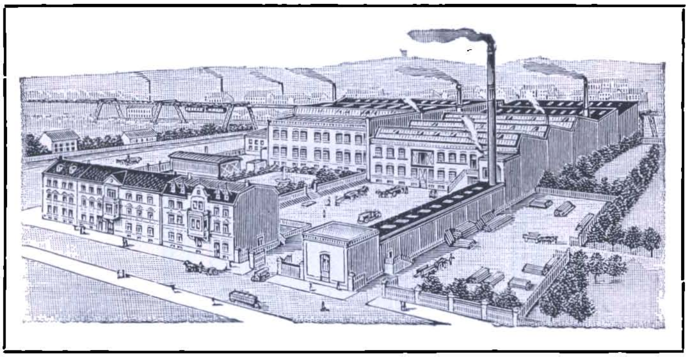
Joh. Fries, Wuppertal-Barmen

Über 32 000 Maschinen mit mehr als 2½ Millionen Klöppel gebaut und geliefert

Plus de 32 000 métiers avec plus de 2½ millions de fuseaux ont été construits et livrés

More than 32 000 Machines with over 2½ millions spindles supplied



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Wuppertal-Barmen
Telephon 53018 und 53019

Codes:
Rudolf Mosse Code.
Bentley's Compl. Phrase Code.

Maſchinen-Fabrik

Spezialität:

Flecht- und Klöppel-Maschinen

und sämtliche einschlägige Artikel

Gegründet 1886

Ateliers de Conſtructions Mécaniques

Spézialité:

Métiers à fuseaux et à tresser et tous les articles de la branche

Maison fondée en 1886.

Machine Works

Speciality:

Braid- and Lace Machines

Established 1886.

Packungs- und Isolierschnur-Maschinen

zur Herstellung von Stopfbüchsenpackungen und Dichtungsschnüren aus Hanf, Baumwolle, Talkum, Asbest, Kieselgurmasse, Schlackenwolle etc.

Diese Maschinen sind auf schweren, gußeisernen Gestellen mit Antrieb an Festscheibe oder Los- und Festscheibe gebaut; mit unter den Maschinen befindlichem Abzugswerk, mit je nach dem Verwendungszweck angeordneten gleitenden oder hängenden Klöppeln, mit Holzkasten oder eisernen Trichtern ausgerüstet, mit und ohne Rührwerk.

Erforderlichenfalls werden die Maschinen auch in zwei Etagen übereinander gebaut, sowie mit festen oder drehbaren Bobinenrahmen ausgerüstet. Für Schnüre, die mit einer Fettmasse getränkt werden sollen, ist ein Fettkessel für Gas- oder Dampfheizung vorgesehen.

Machines pour la fabrication de garnitures et de rubans isolateurs

Ces machines servent à la fabrication de garnitures des boites à étoupe et de rubans isolants en chanvre, coton, talc, amiante, farine fossile, laine de scories etc.

Elles sont montées sur des bâtis en fonte de fer très lourds, sont munies d'une poulie fixe et d'une poulie folle; le dispositif de tirage se trouve au-dessous des machines. Suivant leur application elles sont équipées avec des fuseaux debouts ou suspendus, avec boîtes en bois ou entonnoirs en fer avec ou sans agitateur mécanique.

Les machines peuvent aussi être construites en deux étages superposés et munies de cadres de bobines fixes ou tournants. Pour les rubans qui doivent être imprégnés d'une matière grasse on a prévu un réservoir pour la graisse, chauffé au gas ou à la vapeur.

Packing and Insulating Cord Machines

for making packings for stuffing boxes and packing cords of hemp, cotton, talcum, asbesto, silica, slag-wool, etc.

These machines are constructed on heavy cast-iron frames with fast pulley or fast and loose pulley, with take-up mechanism below the machines, and according to their purpose, with gliding or hanging spindles, with wooden box or iron funnels, with or without stirring mechanism.

If required the machines can also be constructed in two tiers and with fixed or revolving bobbin frames. For cords which are to be impregnated with grease or fat, a grease vessel for gas or steam heating is provided.

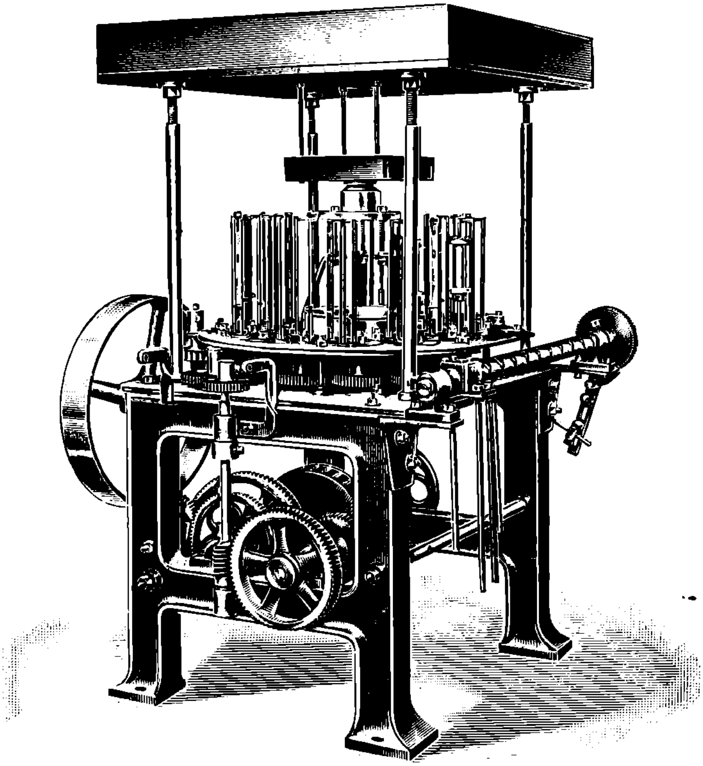

Fig. 44

24er Packungsmaschine für Schnüren aus Asbest oder Schlackenwolle
mit Holz-Füllkasten und selbsttätiger Schnurverlegung.

Machine à 24 fuseaux pour la fabrication de rubans en amiante ou en laine de scories
avec boite de remplissage en bois et déplacement automatique des rubans.

24s Packing Machine for Cords of Asbesto or Slag-wool
with wooden filling-box and automatic cord motion.

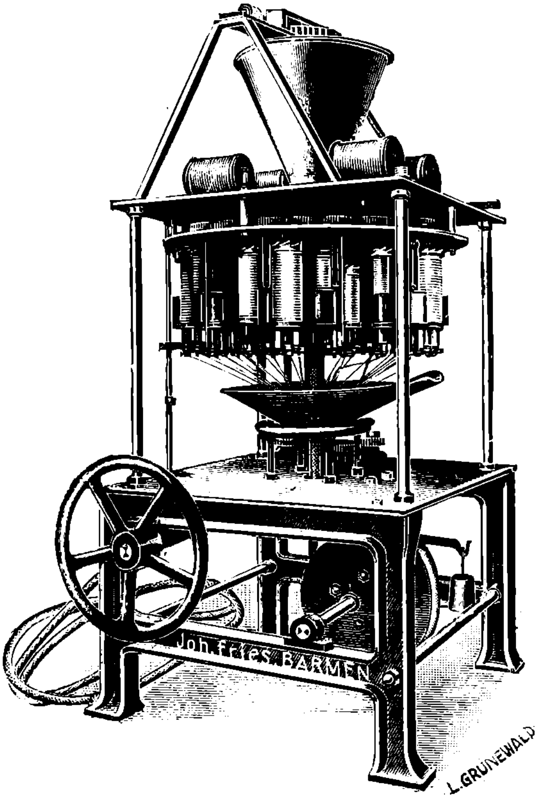

Fig. 45

24er Packungsmaschine für fettgetränkte Schnüre
mit hängenden Klöppeln, mit Fülltrichter und Rührwerk, mit Fettkessel für Gas- oder Dampfheizung.

Machine à 24 fuseaux pour la fabrication de rubans imbibés de graisse
avec fuseaux suspendus, entonnoir et agitateur mécanique, réservoir pour la graisse à chauffage au gas ou à la vapeur.

24s Packing Machine for impregnated cords
with hanging spindles, with funnel and stirring mechanism, with grease vessel for gas- or steam-heating.

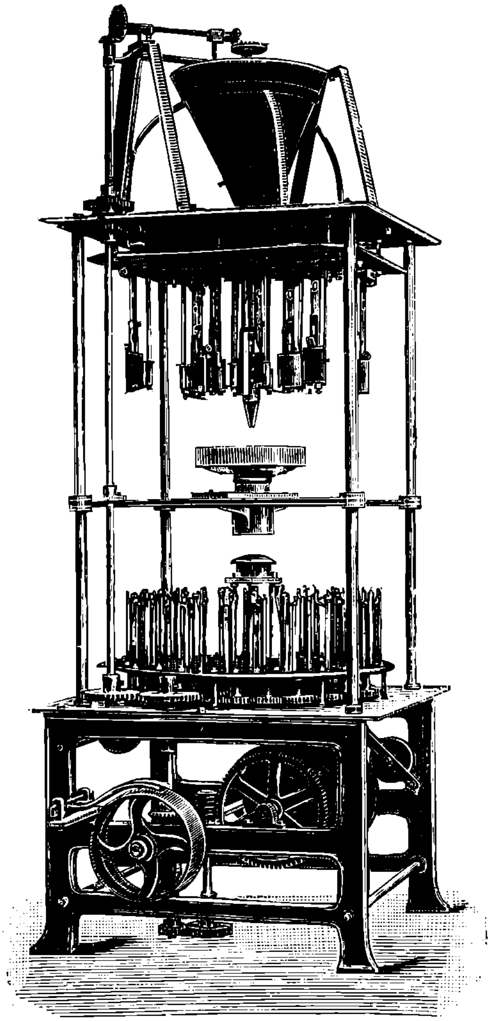

Fig. 46

Packungsmaschine, 2 übereinander gebaut
mit oben 8 **hängenden** Klöppeln, unten
36 Klöppeln mit Füll-Trichter und Rührwerk.

Machine pour la fabrication de garnitures à deux étages superposés
avec 8 fuseaux pendants en haut et
36 fuseaux debouts en bas, avec entonnoir
et agitateur mécanique.

Packing Machine, one above the other,
above 8 hanging spindles, below 36 spindles
with funnel and stirring mechanism.

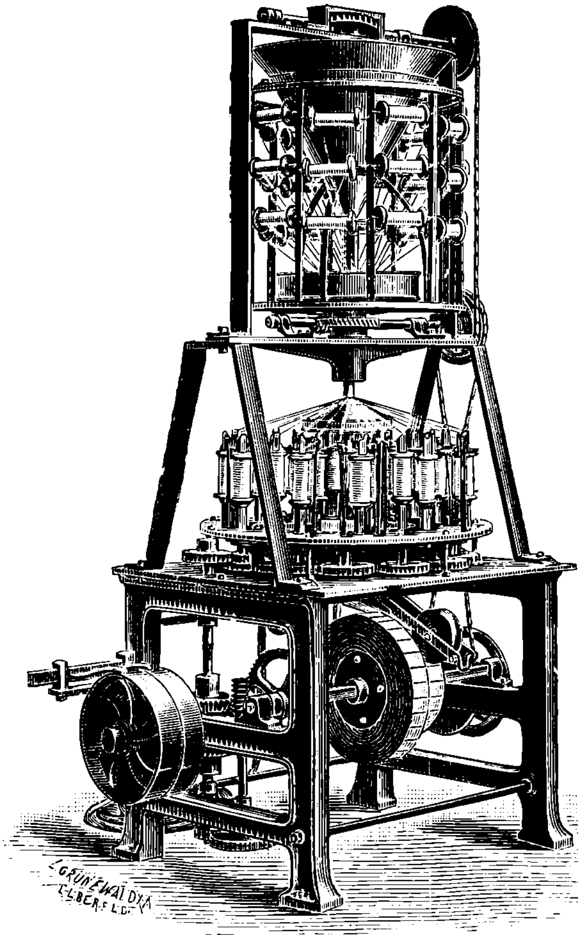

Fig. 47

Packungsmaschine
oben mit drehbarem Bobinenrahmen, mi
Fülltrichter und Rührwerk, unten mit
24 gleitenden Klöppeln.

Machine pour la fabrication de garniture
avec cadre de bobines tournant, entonnoi
et agitateur en haut et avec 24 fuseau
glissants en bas.

Packing Machine
above with revolving bobbin frame, wit
funnel and stirring mechanism, below wit
24 gliding spindles.

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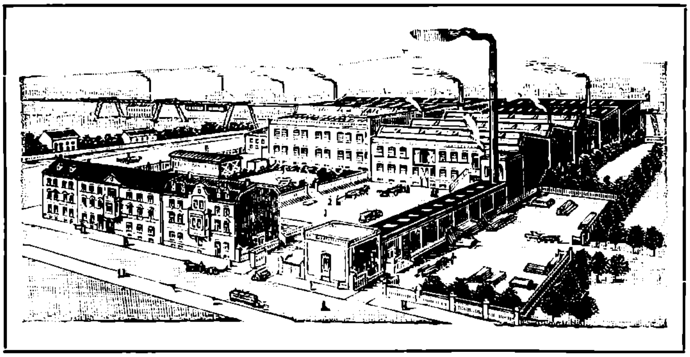

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Lace Machines**

Established 1886.

Zubehör- und Ersatzteile

für

Flecht- und Klöppelmaschinen.

Accessoires

pour

métiers-à-fuseaux pour la fabrication des tresses-plates, cordes-rondes, dentelles etc.

Accessories

for

braid- and lace-machines etc.

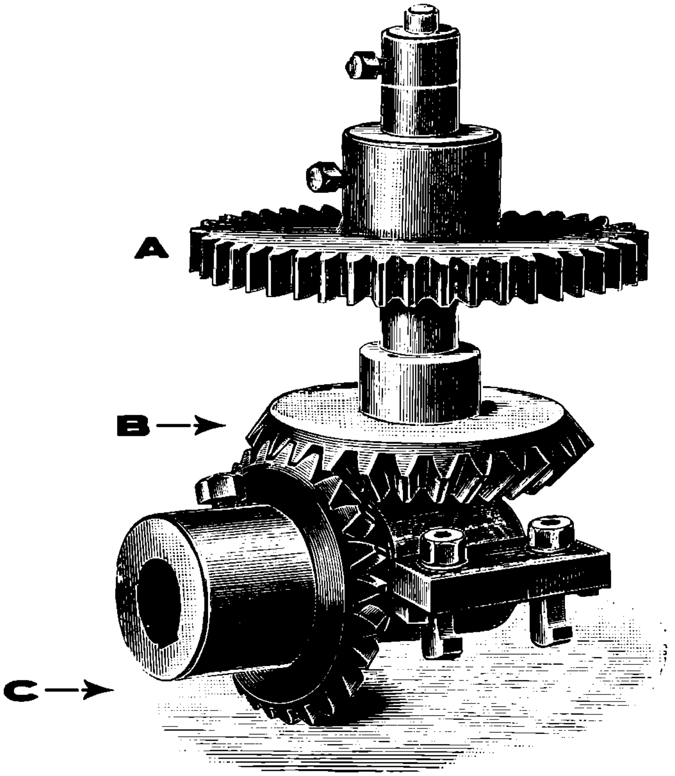


Fig. 56

1 Satz Triebwerk
komplett

1 jeu d'engrenage moteur
completement

1 set of driving-gear
complete

A **Triebrad oder Deckelrad** mit 40, 45, 50, 55 oder 60 Zähnen, nach Wunsch.
Roue motrice supérieure avec 40, 45, 50, 55 ou 60 dents.
Main-driving-wheel with 40, 45, 50, 55 or 60 teeth.

B **Konisches Triebrad mit langer Büchse** mit 28 Zähnen.
Roue motrice conique à longue douille avec 28 dents.
Conical driving wheel with long boss with 28 teeth.

C **Konisches Triebrad für die Welle** mit 22 Zähnen.
Roue motrice conique pour l'arbre de commande avec 22 dents.
Conical driving-wheel for the shaft with 22 teeth.

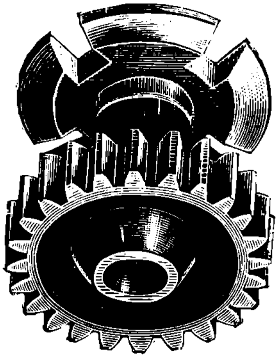


Fig. 57

hohes 4-Flügelrad

molette à encoches **haute**

high 4-horn-gear

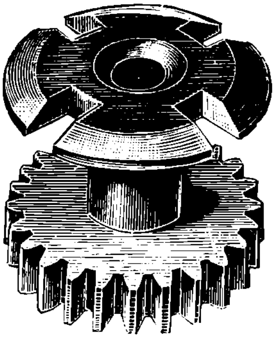


Fig. 58

niedriges 4-Flügelrad

molette à encoches **basse**

low 4-horn-gear

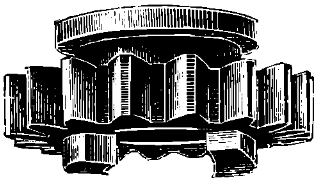


Fig. 59

Aufrad

roue d'accouplement

clutch-wheel

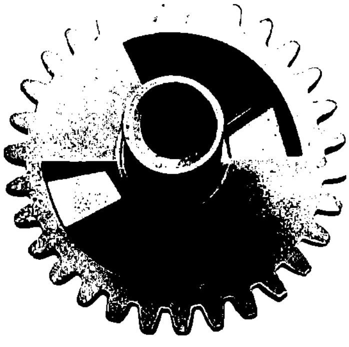


Fig. 60

Vertiefungsrad

roue inférieure d'accouplement

lower clutch-wheel

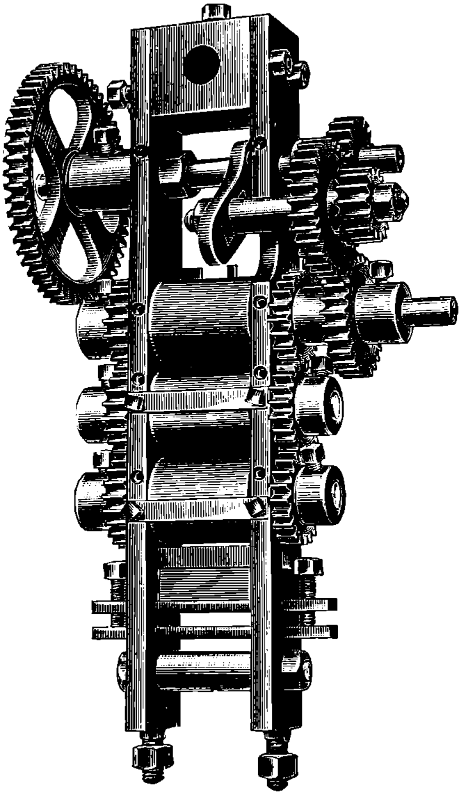


Fig. 61

Walzenabzugswerk
komplett

tirage-à-rouleaux
completement

taking-off-mechanism
complete

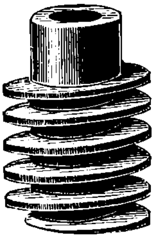


Fig. 62

rechtsgängige Schnecke
vis sans fin, tour à droite
right-hand-worm

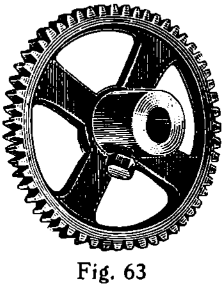


Fig. 63

Schneckenrad
roue à vis sans fin
worm-wheel

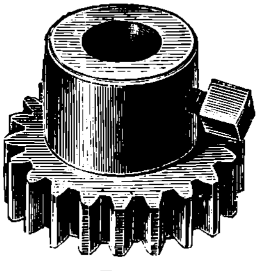


Fig. 64

Wechselrad
roue de changement
change-wheel

65

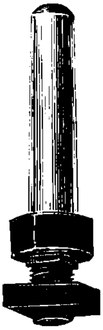
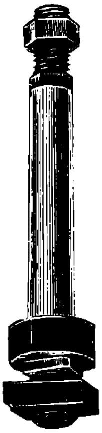


Fig. 66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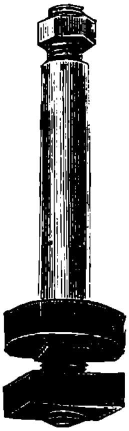
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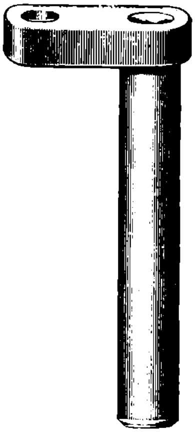
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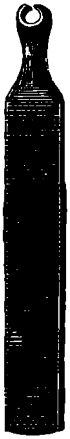
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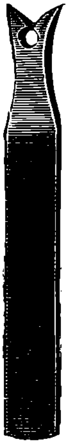


Fig. 71

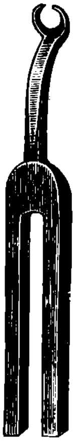


Fig. 72

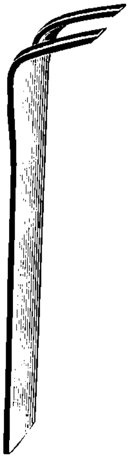
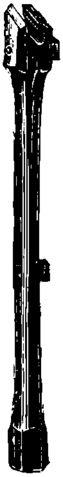


Fig. 73

er de roue secondaire	Fig 65.	**Nebenpfeiler**	**secondary wheel-pillar**
er affaibli-de-roue	Fig. 66	**stupper Radpfeiler**	**blunt wheel pillar**
er de roue perforé	Fig. 67	**gebohrter Radpfeiler**	**bored wheel pillar**
er de roue pour changements	Fig. 68	**Versetzpfeiler**	**wheel pillar for changes**
pilier de crochet r roue d'accouplement	Fig. 69	**Hakenpfeiler**	**hook-wheel-pillar for clutch-wheel**
pour tresses plates	Fig. 70	**gew. Litzenscholle**	**braid-guide**
en forme de cornes pour tresses	Fig. 71	**Hörnerscholle**	**horn-braid-guide**
pour dentelles	Fig. 72	**Spitzenscholle**	**lace-guide**
pour tresses-des-chapeaux	Fig. 73	**Hutlitzenscholle**	**hat-braids-guide**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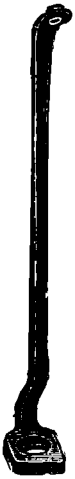
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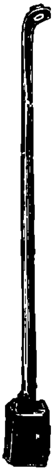
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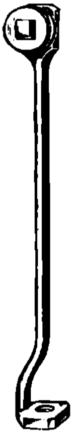
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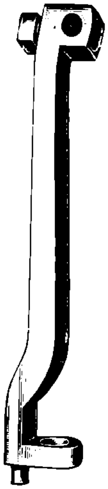


Fig. 78

Fig. 74

Federbock, rund, gespalten

pilier de support pour l'aiguille

finger-standard which bears the braid-fingers

Fig. 75

Mittelendfeder mit gewöhnlichem Fuß

ressort pour âmes
avec pied ordinaire

middle-end-spring
with ordinary base

Fig. 76

Mittelendfeder mit geschlossenem Fuß

ressort pour âmes avec pied-fermé

middle-end-spring with closed base

Fig. 77

Mittelendfeder mit Röllchen für Gummilitzenmaschinen

ressort pour âmes avec roulette

middle-end-spring with roll

Fig. 78

Federbock mit Stift

pilier de support pour l'aiguille

finger-standard which bears the braid-finger

Fig. 79

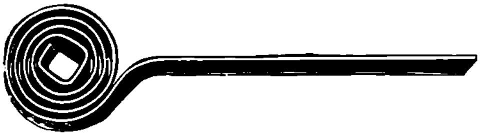


Fig. 80

Schaukel- und Aussetzer-Federn

ressorts pour débrayageur

springs for stopping rockers

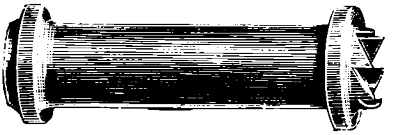


Fig. 81

bobine en bois **Holzspule** **wooden-bobbin**

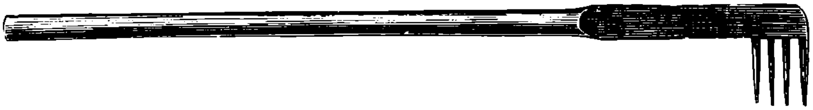


Fig. 82

ne pour appareil-battant **Schlägerkamm** **beating-fork**

Fig. 83

Kläppchen mit Porzellanauge

cliquet pour fuseaux avec oeillet en porcelaine

dropper for spindles with porcelain-eye

Fig. 83

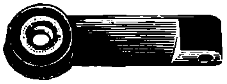


Fig. 84

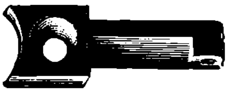


Fig. 84

Kläppchen mit versenktem Auge

cliquet pour fuseaux avec oeillet enfoncé

dropper for spindles with sunk eye

Fig. 85

Drahtaussetzer

rrêt en fil de metal

re-slide for spindles

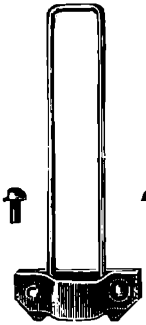


Fig. 85

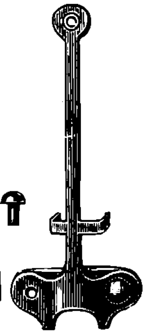


Fig. 86

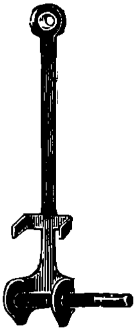


Fig. 87

Fig. 87

Schraubenaussetzer

arrêt avec vis

screw-slide

Fig. 86

t aveç plate et rivet **Plattenaussetzer mit Niete** **slide with plate and rivet**

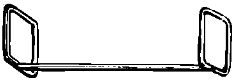


Fig. 88

support-fils **Drahtuntersatz** **wire-stand**

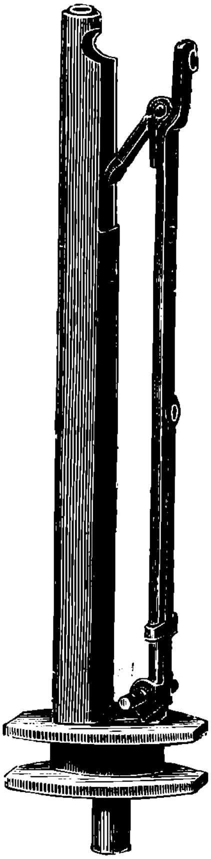


Fig. 89

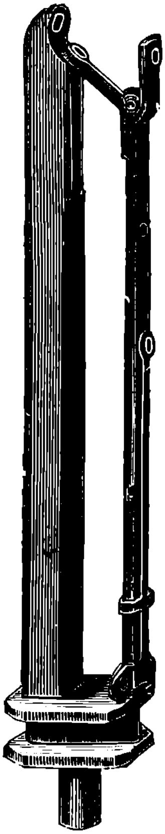


Fig. 90

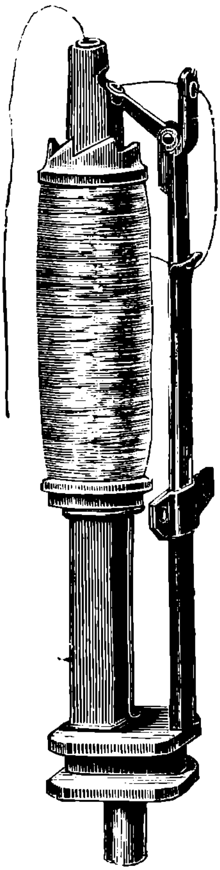


Fig 91

Fig. 89

Klöppel mit ovalem Fuß und Schraubenaussetzer für Spitzenmaschinen

fuseau avec pied oval, avec arrêt avec vis, pour métiers-à-dentelles

spindle for lace-machines with screw-slide

Fig. 90

Klöppel mit gewöhnlichem Fuß und Plattenaussetzer und schrägem Büchsenk

fuseau avec pied ordinaire, avec arrêt avec plate et rivet, avec tête oblique

spindle for braiding-machine with ordinary foot box-head with slide with plate and rivet

Fig. 91

Klöppel mit gewöhnlichem Fuß m. Drahtaussetzer, mit Holzspule und Unters

fuseau avec pied ordinaire, avec arrêt en fil de metal, avec bobine et avec support-fils

spindle for braiding-machines with wire-slide with bobbin and wire-stand

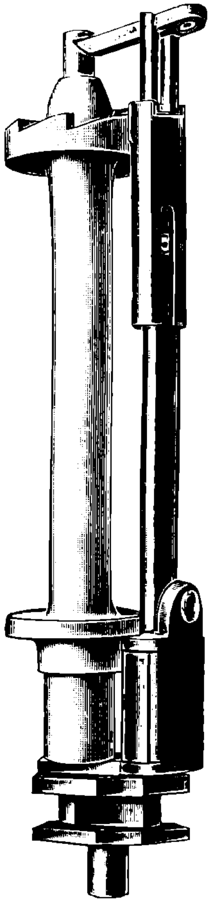


Fig. 92

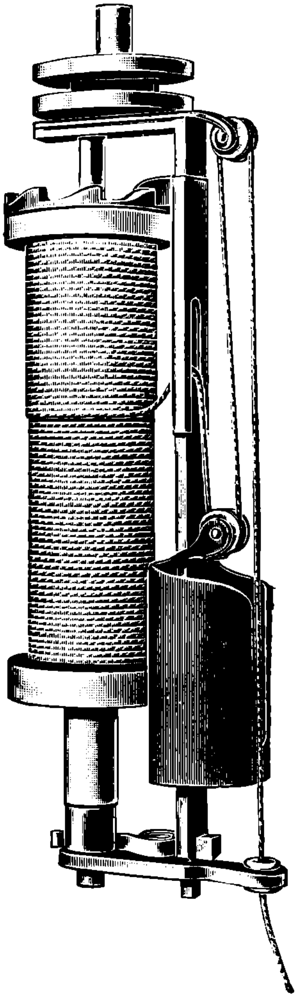


Fig. 93

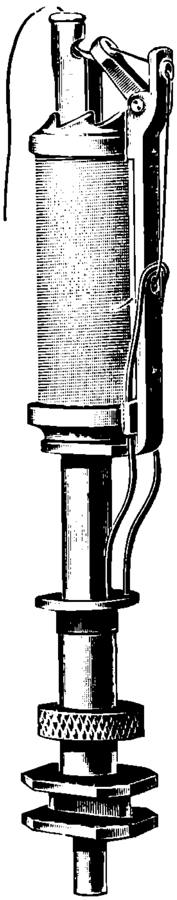


Fig. 94

Fig. 92

gewichts- oder Patentklöppel, mit Untersatz, Holzspule und Gewicht

fuseau bréveté avec support et bobine en bois et avec poid en dehors

-spindle with wooden-bobbin and with bobbin-stand and weight on the outside

Fig. 93 **Hängeklöppel mit Holzspule und Gewicht**

fuseau suspendu avec bobine-en-bois avec support et poids-en-dehors

hanging-spindle with wooden-bobbin with weight on the outside

Fig. 94 **drehbarer Wendeklöppel**

fuseau-tournant **turning-spindle**

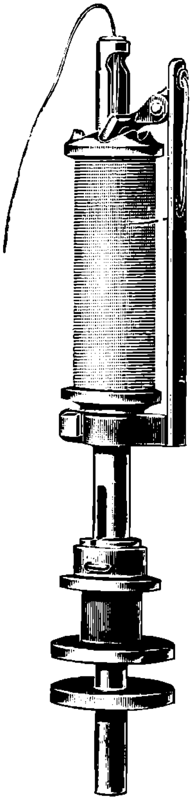
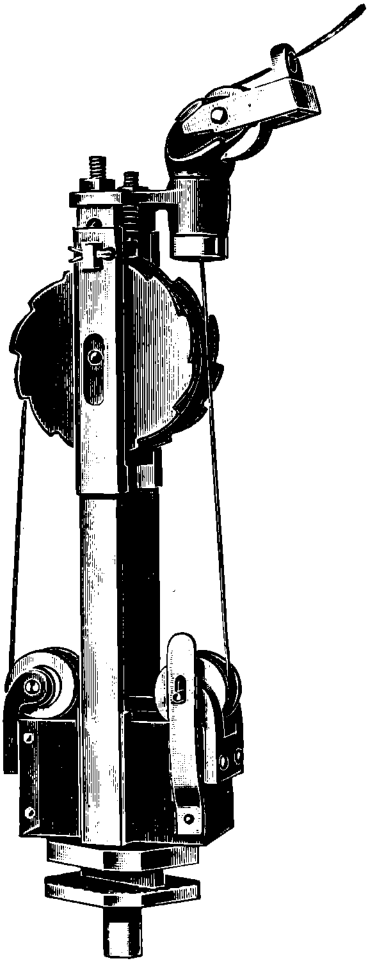


Fig. 95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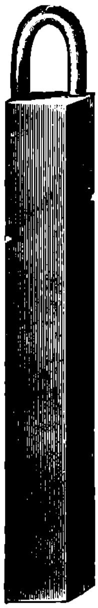
Fig. 97

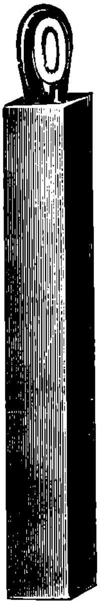
Fig. 98

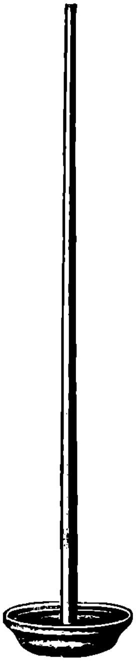
Fig. 99

Fig.

Fig. 95

Klöppel für einfädige Spitzenmaschinen

fuseau pour métier-à-dentelles de un fil

spindle for 1-thread lace-machines

Fig. 96

schwerer Drahtklöppel

fuseaux pour métier-à-tresser des cordes-rondes en fil-metal

spindle for wire-cord-machines

Fig. 97

Bleigewicht mit Stahldrahtauge

poid en plomb avec oeillet en fil meta

lead-weight with steel-eye

Fig. 98

Bleigewicht mit Porzellanauge

poid en plomb avec oeillett en porcelain

lead-weight with porcelain eye

Fig. 99

Schmutz- oder Ölpfeife

tuyau pour saisir l'huile

pipe for catching the oil

Fig. 100

Flechtnadel

aiguille pour tresser

Braid Finger

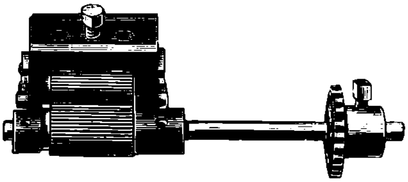

Fig. 101

Rüsche m. Riffelwälzchen zum Abziehen der geflochtenen Ware bei Spitzenmaschinen

rouleau débiteur drégé pour
métier-à-dentelles

taking-off-mechanism for lace-
machines with fluted rollers

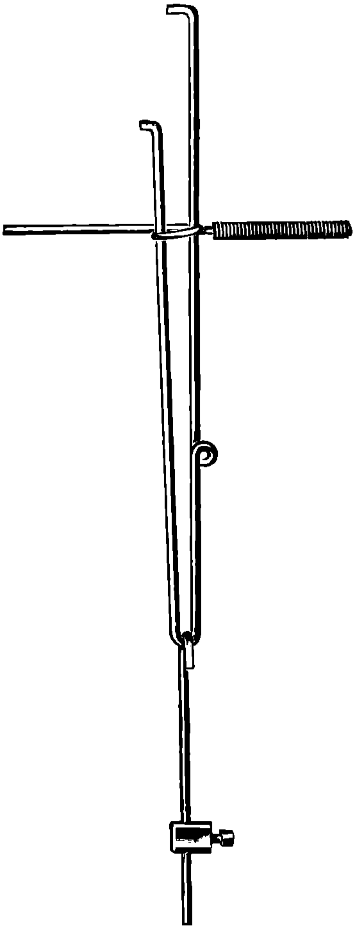

Fig. 103

**Platine mit Platinennadel
mit Feder und Haken,
mit Klötzchen und Schraube**

platine avec ressort et crochet
et bloc en fer
avec vis, pour métiers-à-dentelles

upright with needle and spring
and iron-block
with screw for lace-machines

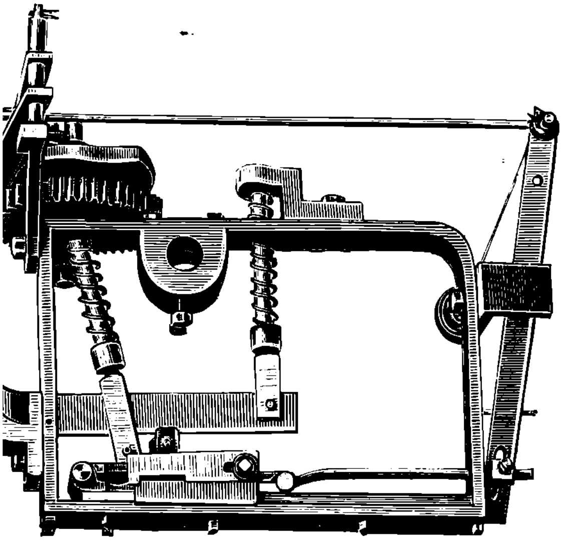

Fig. 102

Zange zur Erbreiterung von Spitzen

pince pour élargir les dentelles

tong for widening the laces

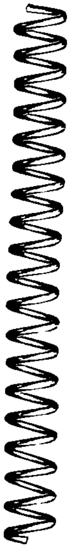

Fig. 104

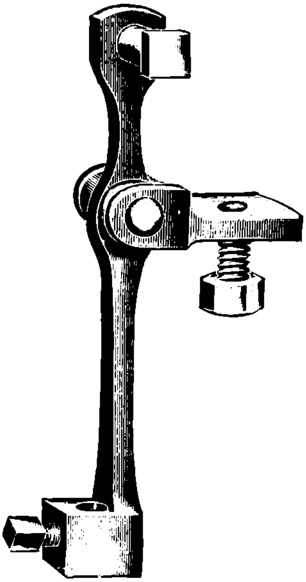

Fig. 105

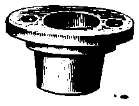

Fig. 106

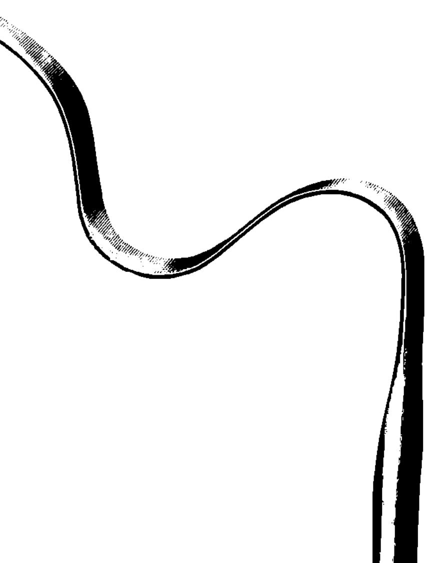

Fig. 107

Fig. 104

ressort pour platine **Platinenfeder** spring for uprights

Fig. 105

Ärmchen für Kronschläger für zweifädige Spitzenmaschinen

petit-bras pour appareil-battant-de-couronne, pour métier-à-dentelles

small-arm for crown-beater for lace-machines

Fig. 106

Scholle für einfädige Spitzenmaschinen

bec pour métier-à-dentelles de 1 fil lace-guide for 1-thread lace·

Fig. 107

Dorn für einfädige Spitzenmaschine

épine pour bec pour métier-à-dentelles de 1 fil

thorn for lace-guide for 1-thread lace-machines

Joh. Fries, U.-Barmen.

Machine Works

Established 1886

Speciality:

Braid- & Lace Machines

of every description and for all purposes, as well as all Accessory Machines and Parts.
Whole Plants supplied.

More than 27000 Machines supplied.

Dear Sirs,

I have pleasure in handing you my latest illustrated catalogue for

BRAID- AND LACE-MACHINES

of all kinds for making flat and tubular Braids, Elastic Braids, Laces, Novelties, Wash Lines, Spindle-Bands, and for braiding Elastic Wires, Cables, Packings, etc., as well as for Troughs, Gearings, Accessories and Spare Parts.

My machines meet the highest technical requirements and have assured me the confidence and appreciation of my numerous clients amongst whom are the largest firms of the trade. For this reason I hope you will also favour me with your orders and I have no doubt that the machines would give you entire satisfaction.

Long practical experience and the modern equipment of my works enable me to do justice to all demands made upon me and to meet all competition.

The machines are built under my personal supervision and I give the fullest guarantee for them provided they are operated correctly.

Yours faithfully.

Joh. Fries.

The illustrations of the catalogue are not binding as to details, as I am always endeavouring to make further improvements in the construction and to render the machines more perfect.

All rights reserved.

GENERAL REMARKS ABOUT CONSTRUCTION OF THE MACHINES.

machines and all the parts are made of the best and most suitable

thed wheels of the machines have milled teeth which guarantee a motion with the smallest possible wear.

er plates as well as the lower plates and spindles are made of the ron. All the bearings for shafts, journals, bolts, etc., are of ample size educe the wear and tear as much as possible.

machines are provided with stopping motions which automatically stop a thread breaks or a bobbin runs empty.

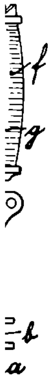

Fig. 1 shows the most common so-called **„Barmen Spindle"** In the sketch „a" indicates the spindle pin which is driven by the horn-wheels, „b" is the centre-piece which glides through the track of the machine, „c" ist the tension- or lead-weight which can move up and down in the spindle-box „d", „e" is the spindle latch which grips into the dented crown of the wooden bobbin „f".

From the wooden bobbin the yarn thread runs through an eye of the slide „g", then in the direction of the arrow through an eye of the spindle latch „e", through an eye of the tension-weight „c" and then upwards through the top of the spindle-box „d".

Apart from this so-called „Barmen-Spindle" many other varieties are used, f. i. **Patent- or Outer-weight-Spindles,** or for special purposes **Hanging Spindles, Wire Spindles, Rotating Spindles,** and others.

Every machine is provided with an automatic roller take-up motion.

Cord- und Braid Machines from 28 and 29 spindles per head upwards are provided with a large centre-wheel whereby the centre-wheels are driven in several places which ensures a more uniform and regular run of the spindles, a smaller wear of the wheels and also the production of better goods.

Unless specially ordered otherwise, the machines are arranged from **troughs** or **driving tables.** Only if specially desired and for small nachines are supplied with **separate drive** either for **hand** or **power**

vy machines, particularly for technical purposes, the separate drive is able even for large factories. In such cases each machine is mounted on **-iron frame.**

A.

MACHINES FOR RUSSIA & PRESIDENT BRAIDS.

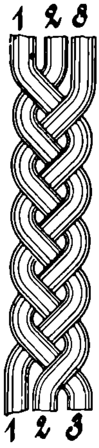

Fig. 2

The smallest number of threads for braiding are used in Russia Braids, particularly for candle wicks and coir tresses; **Fig. 2** shows such a braid which consists of only 3 threads. For the trimming industry Russia Braids of less than 5 threads are hardly ever used. In most cases a larger machine would be used, say one of 9 spindles and by letting some of the spindles run empty, a 3-thread Russia Braid can be produced. The Russia Braid Machines are most commonly built in the following sizes:

3 spindles 2—10 heads { for candle wicks, according to the diameter of the flanges of the wooden bobbins, 34—75 mm diameter.

5	spindles	8—10	heads	15	spindles	3—4	heads	
7	„	8—10	„	17	„	3—4	„	
9	„	6—8	„	19	„	3	„	
11	„	5—6	„	21	„	2	„	
13	„	4—5	„	23	„	2	„	and so on.

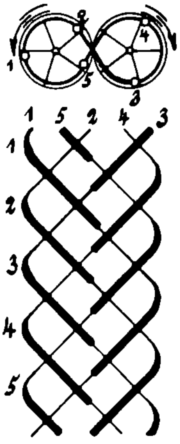

Fig. 3

Fig. 3 shows the **track** and **braid** of a **5 spindle** Russia Braid Machine.

The machines can naturally also be made with a larger or smaller number of heads. The deciding factor for the number of heads is the length and breadth of the machine and the diameter of the flanges of the wooden bobbins. For the trimming industry it is usual to employ the same kind of wooden bobbins as for the normal Cord- & Braid-Machines, with a diameter of flange of about 35 mm.

The Russia Braid Machines have mostly an odd number of spindles. 3, 5, 7, 9, etc., Machines with an even number of spindles are more rarely used, as for instance 12-s with one five-horn and one seven-horn gear.

President Braid Machines produce a braid which in its longitudinal sense shows 3 degrees. ((**Fig. 4** and Plate A. Nr. 3 & 4). The most currect machines of this kind have 6 heads and 8 spindles.

Machines with 9, 10, 11 and up to 18 spindles are more rarely used.

Sometimes cross-tracks are built into the tracks of the President Braid Machines for the production of so-called rollers on the centre degree or on the two outer degrees.

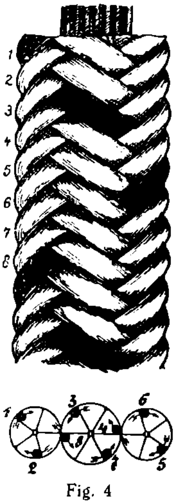

Fig. 4

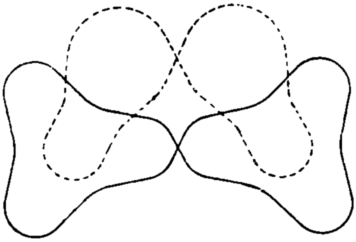

Fig. 5

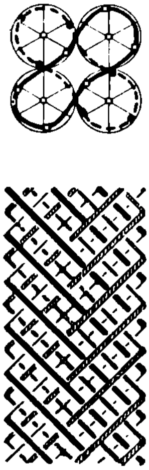

Fig. 6

In a certain sense the **Bouritas-, Square-Cord-,** or **2-colour Russia Machines,** also belong to the Russia- and President Braid Machines, because the goods produced on them are used for similar purposes as trimmings. (See Plate A No. 18, 19 and 20.)

Fig. 5 shows the tracks of a **16 s Bouritas-Machine,** in which usually 9 spindles are placed in the track indicated by a thick line and 7 spindles in the track shown by a dotted line. **Fig. 6** shows the track and diagram of a **12 s Square-Cord Machine** and **Fig. 7** the track and diagram of a **12 s Trapeze-Cord Machine. Fig. 8** represents a **10-head 7 spindle Russia Braid Machine.**

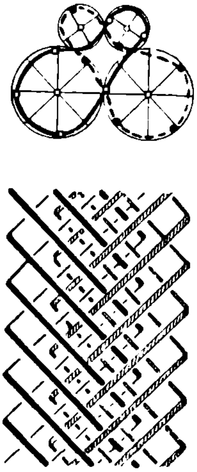

Fig. 7

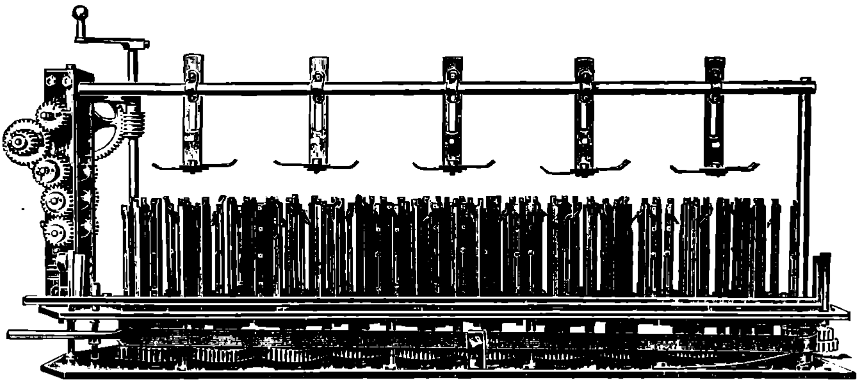

Fig. 8

Russia Braid Machine 10 heads of 7 spindles each.

B.

BRAID-AND CORD-MACHINES.

These machines produce all kinds of braids, particularly flat and tubular braids, including boot-and shoe-laces, of silk, wool, cotton, linen, etc.

Braids and Cords are made in various kinds and are called: one-, two-, three-plait goods etc., according to the manner in which the threads cross each other.

The **one-plait** or Diamond quality has an even number of spindles, beginning with 10 and rising by 4. In this kind of braiding 2 spindles always follow on another 2 spindles, so that there are always 2 threads crossing over or under 2 other threads. (see Plate A No. 7, 8, 27—29). In **Fig. 9** a 22s Diamond-Braid is shown with the relative track and horn gear. The sketch shows exactly the position of the spindles.

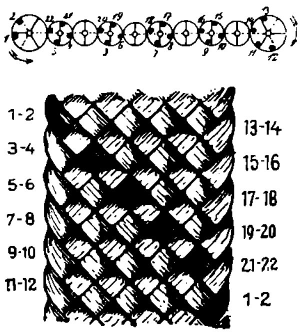

Fig. 9

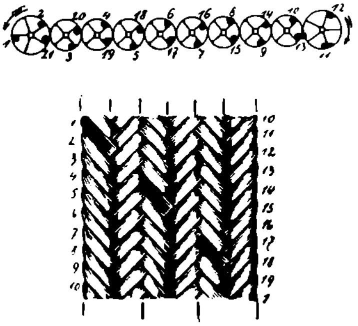

Fig. 11

Fig. 10 represents a 26s Diamond-Braid in which the position of the spindles and the track is also distinctly shown.

The **two-plait fabric** is the most common and the machines producing it have mostly an odd number of spindles, beginning with 9 and rising by 4. In two-plait goods, one single thread crosses over or under two others (see Plate A No. 6, 9—13 etc.) **Fig. 11** shows a 21s two-plait fabric with the respective tracks and horn gear, and in **Fig. 12** a 25s Braid is shown.

The **three-plait quality** has also an odd number of spindles, commencing with 13 and rising by 6 spindles (see Plate A No. 5).

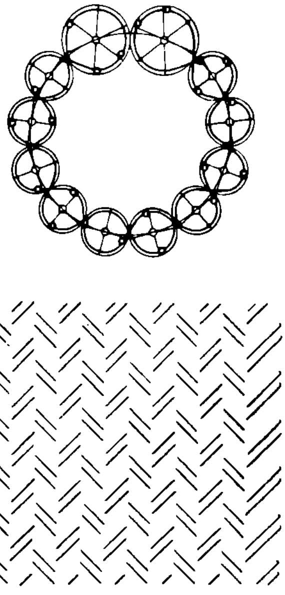

Fig. 10

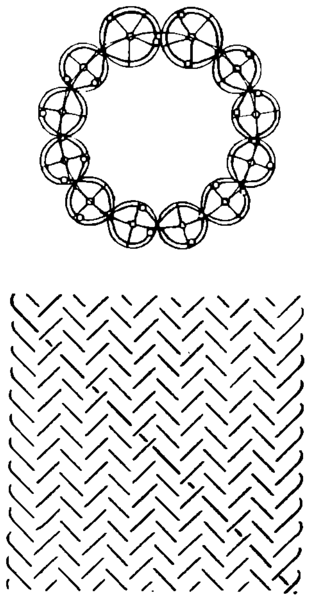

Fig. 12

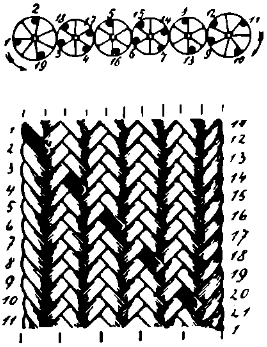

Fig. 13

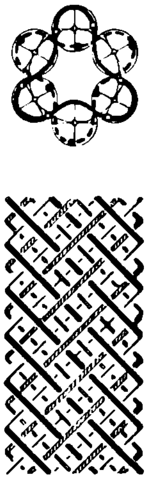

Fig. 15

In the three-plait system the thread of one single bobbin always crosses over or under the threads of 3 other bobbins. **Fig. 13** represents a 19s three-plait fabric with the corresponding track. **Fig. 14** shows a 25s three-plait fabric.

The same remarks apply to fabrics of four-plaits and more and also to **one-, two- & three-plait Cord- or Tubular-Braid-Machines,** but Cords or Tubular Braids are mostly made on one- or two-plait machines. These tubular Braid-Machines are made from 12 spindles upwards, rising by 4 spindles. **Fig. 15** shows the diagram and tracks of a 12s 2-plait Cord-or Tubular Braid-Machine.

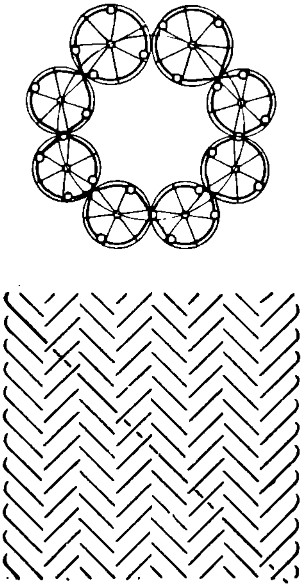

Fig. 14

If desired Braid Machines can be provided with **changes** by means of which several numbers of braids can be made on the same machine.

By exchanging horn-gears and a part of the track, the length of the track and the number of spindles can be reduced or increased. **Fig. 16** shows the track of a **97s Braid Machine** with 2 changes, to 93**s,** 89**s** and 85**s.** The changes are indicated by the shaded parts „a" and „b". On the left-hand side of the machine, at „a", the four-horn gears are built in, so that the spindles all run to the end-wheel No. 48. On the right-hand side, at „b", 4 plates have been shut off. The four-horn gears No. 4 and 5 have been taken out and in place of No. 5 a five-horn gear with the turn-plate has been built in, together with the change-plate required, as shown at „b", so that an **89s Braid** can now be made.

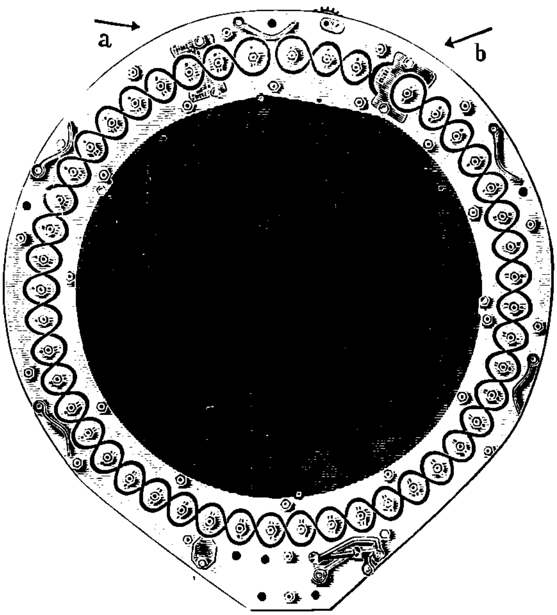

Fig. 16

' with plates No. 46 and 47 were taken out and gear with the corresponding turn-plate and change- „b", the machine could be used for an **85s Braid.** by putting four-horn gears in the plates No. 4 and :hange-pieces, in the manner seen at „a"; the tracks nachine from where the spindles return.

n the right-hand side the track is made continuous : end-plate No. 1, and on the left-hand side, at „a", ry change-pieces is built in at plate No. 46.

ιids can also be made **convertible to Round- or Tubular Braids.** Such changes are illustrated in **Fig. 17** which shows the track of a **2-head 49 s Braid Machine with change to 48 s tubular.** The shaded portions of the illustration indicate the **changepieces for Tubular- and Flat Braids** which can be taken out.

In the upper head the turn-plates with the corresponding five-horn gear are built in at plates No. 1 and 24, so that the spindles do not cross at that point, but return. In the lower or front head the change-piece for tubular braid is inserted, with four-horn gears on plates No. 25 and 48 so that the tracks are continuous and the spindles do not turn back at this point. In this way the hollow- or tubular braid is produced.

The **Machines for Diamond Braid** can also be altered into **Machines for two-plait flat Braids** by means of change-pieces. This is done in a way similar to that shown in **Fig. 17,** by replacing the six-horn gears of the Diamond Braid machines by five-horn gears with the corresponding end-plates and change-pieces. The Diamond Braid machine can also be changed to one or several numbers lower.

A three-plait flat Braider can not be changed to Diamond or two-plait, but it can be provided with changes to one (or two) numbers lower, for instance 73s three-plait to 67s and 61s three-plait.

ɜr **two-plait flat machines with an odd number of** e to **two-plait flat machines with an even number of** t. In these cases the five-horn gear is replaced by a three-horn gear. Two-plait flat machines with an even number of spindles are used when the colours of the threads require this, for instance alternately light and dark.

Machines for Braid and Cords with a small number of spindles are generally built with several heads on one plate. These heads, forming one machine, have a common drive, a common stopping motion and a common roller take-up. These multiple-head machines take up less space and are cheaper than the corresponding number of one-head machines.

The number of spindles of a machine is practically unlimited. The largest machines constructed by me up to the present were 601s, two-plait, and 361s three-plait.

The number of heads to be put on one plate is a matter of experience. The Braid Machines which are used in great numbers for making Boot- and Shoe-Laces, Hat-Braids etc., are usually built in the following sizes:

9s	6-heads
13s	4- and 5- ,,
17s	3- and 4- ,,
21s	3- ,,
25s	2- and 3- ,,
29s	2- and 3- ,,
33s	2- and 3- ,,
37s to 53s	1- and 2- ,,

and from 57s upwards only 1-head.

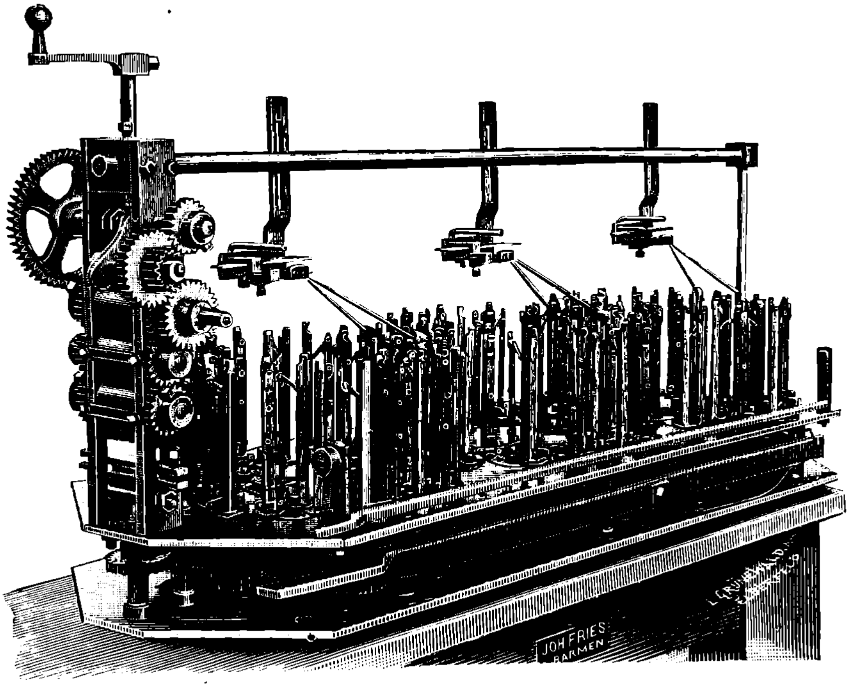

Fig. 18 Braid Machine of 3-heads, each 29 spindles.

The Cord Machines for tubular braids are built in the same sizes with the corresponding numbers of spindles.

Fig. 18 shows **a 3-head 29s two-plait Braid Machine without beating fork**, as used for flat braids, both straight and zigzag of all kinds. On this machine 3 braids can be made at the same time.

Fig. 19 shows a **2-head 49s Flat Braider with beating fork,** and **Fig. 20** a **1-head 57 s Flat Braider with beating fork.** The machines from 41 s upwards are mostly provided with beating forks. The two arms of the mechanism beat alternately close to the braiding point between the crossed threads whereby a firmer and more regular fabric is produced.

Fig. 21 represents a **97s Braid Machine** without the spindles. This machine, as well as **Fig. 20,** shows above the braiding point the so-called **knot-catchers** or stoppers which stop the machine at once if any unevenness or knots are formed in the Braid. **Fig. 22** shows a **4-head 16 s Tubular Braid Machine.**

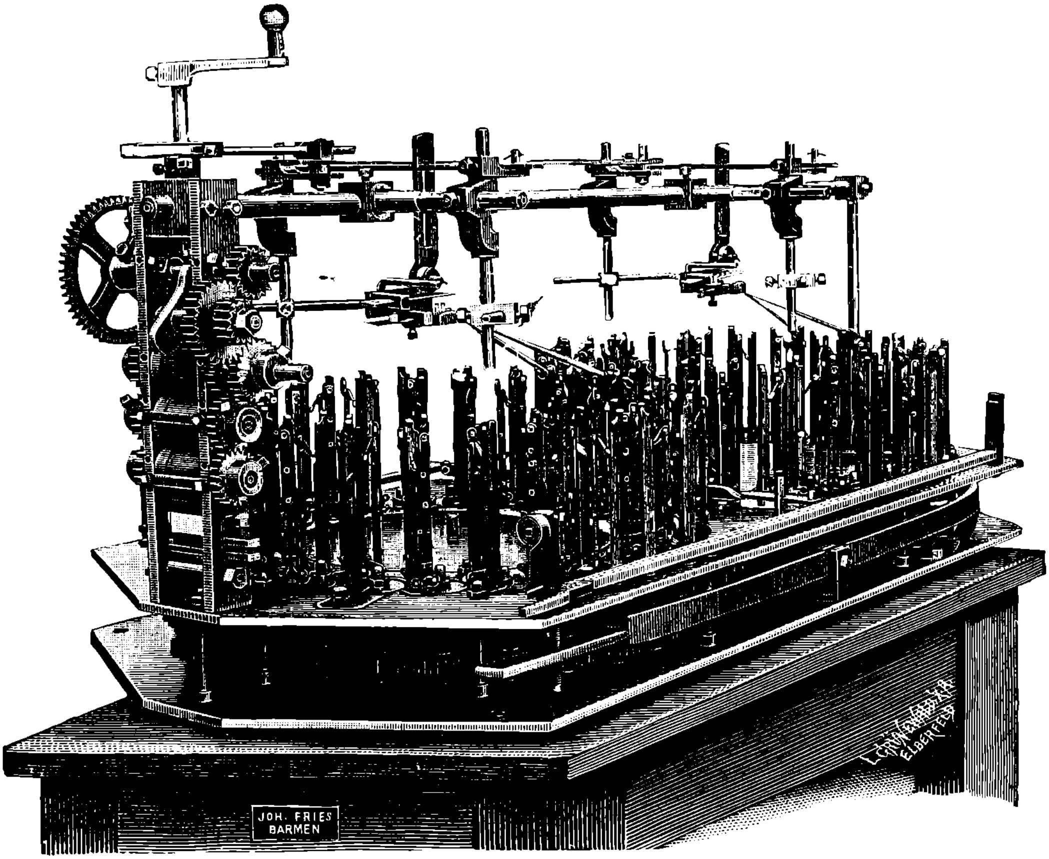

Fig. 19

Braid Machine of 2-heads, each 49 spindles, with beating fork.

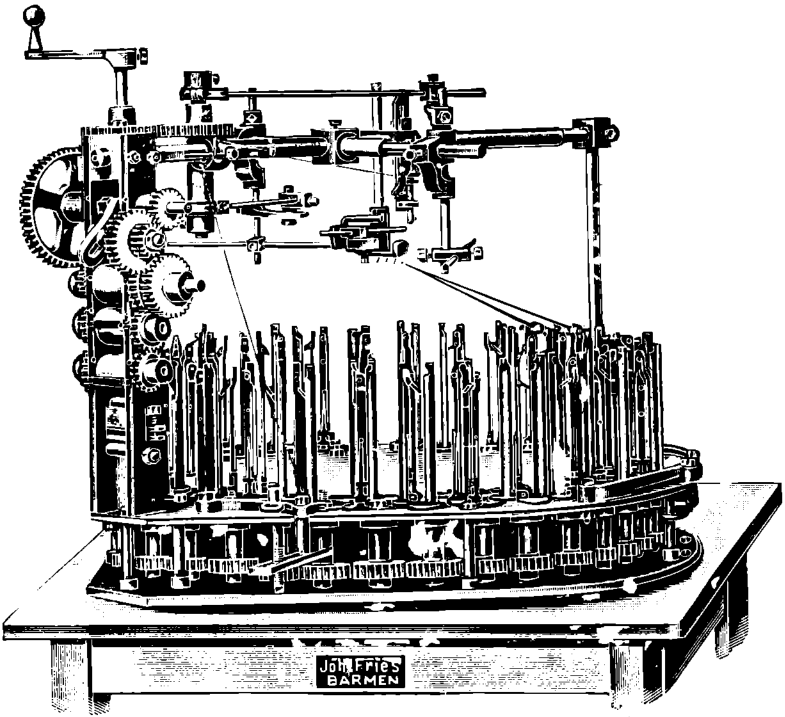

Fig. 20 Braid Machine of 1-head, 57 spindles, with beating fork and Kno

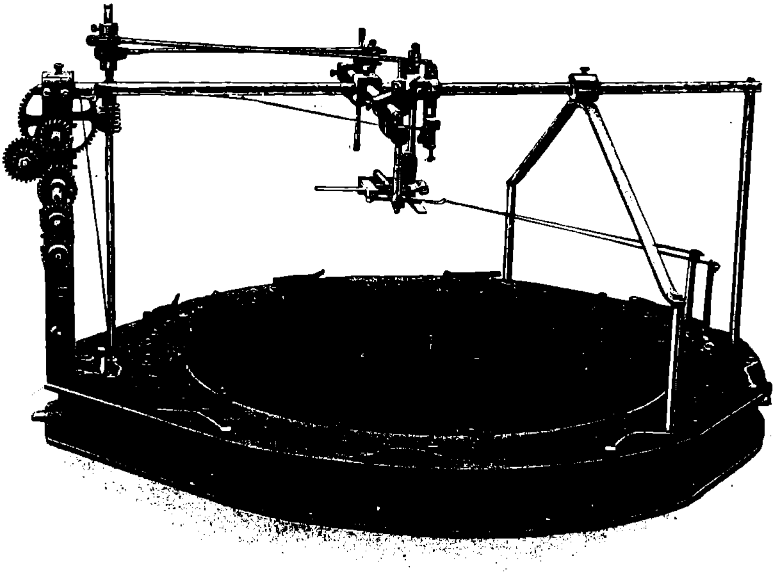

Fig. 21 Braid Machine of 97 spindles with Knot-catcher.
(without spindles)

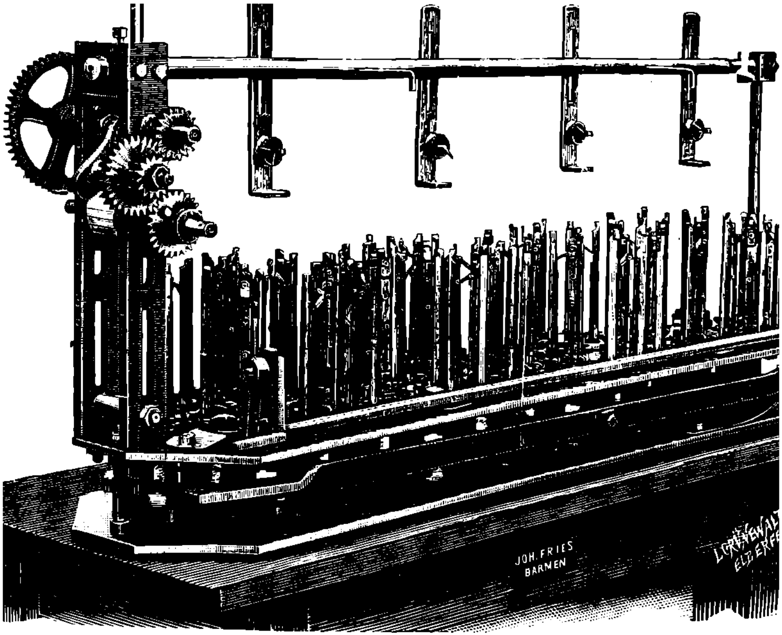

Fig. 22 Tubular Braid Machine of 4-heads, each 16 spindles.

C.

BARMEN LACE MACHINES.

The Laces made on Braid Machines consist of single bands whose threads are transferred from one to the other. The binding of the threads of the bands in **Jacquard- and Cross-bound Laces** is two-plait, i. e. one thread crosses always over and under two other threads. The only exception is in the places where the threads cross from one band to the other; these are 5-plait in Jacquard-Laces and 2—1—2 plait in Cross-bound Laces.

The exchange of the spindles of two adjoining bands in both systems takes place in a very simple manner, by means of a repeat mechanism and more rarely by means of Jacquard-Machines. The number of spindles for both kinds of machines is similar.

Machines with 9 spindles per band are largely used, such as: 2×9, 3×9, 4×9, etc., or with stronger end-band, such as: 2×9+18, 3×9+27; Machines with 7, 11 or 13 threads per band are more rarely used. (see Plate B No. 31—35.)

By reducing the number of threads per band, one obtains the **Braided Laces** which are called **4-thread** and **3-thread** Lace, or the **Bone Lace** to which latter belong the **2-thread** and the **1-thread** Lace.

If all the spindles in a 4, 3, 2 or 1-thread Lace Machine cross regularly from one band to the other, a one-plaid close fabric is produced, i. e. one thread crosses alternately over and under another thread. An open-work fabric, a Lace or an Insertion is produced if some of the spindles cross over and some turn in their own band according to a pattern. Formerly repeat-wheels were used for actuating the points and turn-plates, but now Jacquard Machines with the well-known punched cardboard cards are exclusively used as these facilitate the working very much. It may be mentioned here that in my machines all the wires are arranged in turn and that a hole in the card causes the opening of the turn-plate, or of the points and the crossing of the spindles from one band to the other. (If specially desired the machine can also be made to close the points so that a hole in the card corresponds to a hole in the Lace). For this reason it is unnecessary to draw a special punching pattern for my machines (which has to be done in some cases for 1-thread machines of other systems), but the Jacquard Card is punched at once according to the design. Further there is no difficulty in following the course of the spindle in the machine by means of the Jacquard Card.

The 4-, 3- and 2-thread Lace Machines have a common drive from a trough, similar to that of the Cord- and Braid-Machines. Separate drive is rarely used.

In order to prevent a rapid wear, the driving power in the large machines is transmitted from the front-wheel immediately to the centre-wheel (see **Fig. 23**). The necessary intermediate wheels can be exchanged easily and quickly without dismounting the machine, if after a time such an exchange should really become necessary owing to wear.

Fig. 23 shows the track and the arrangement of the wheels of a **4-thread Lace Machine.** In the rigth-hand half of the figure the shaded wheels indicate the wheels belonging to one band. Each band therefore consists of 2 compound six-horn end-wheels and one four-horn intermediate wheel. One horn is occupied by a spindle, three horns are empty. The same as in the other machines, the outer bands make an exception with regard to the arrangement of the wheels.

For making lace with open or closed eyelets on the edges, so-called Outrunners are used. The machines shown in **Fig. 23,** where the Outrunners are marked both on the right-hand and left-hand side, are therefore called: **4-thread Lace Machines of 10 bands with 2 right-hand outrunners and 3 left-hand outrunners.**

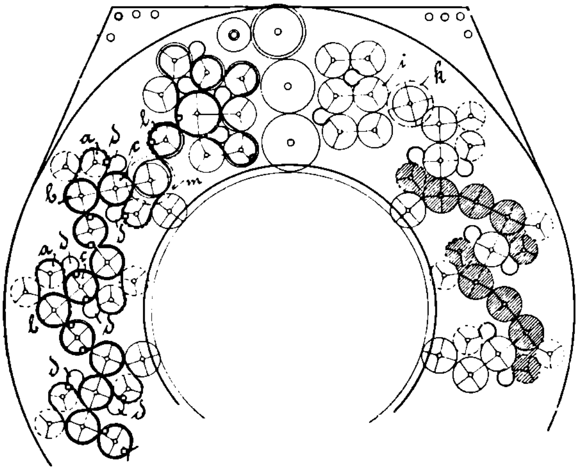

Fig. 23

If on each of the outrunner plates, braiding fingers are put, whose point is bent upwards and led into the former, the thread guided over the outrunner, lays itself round the vertical point of the finger and forms a loop in the fabric. With several outrunners and corresponding adjustment of the fingers, loops of various sizes can be produced at the edge of the pattern. The various bindings of the threads are produced by beating combs or by a crown beater at the formers. Close above the former, the fabric goes through two small fluted bronze rollers which can be so adjusted, that one edge of the lace becomes longer than the other. Between the Ruche-box and the take-up roller the lace is guided through a tong which widens the lace and makes the pattern more distinct. Samples of 4-thread Lace and of Novelties made on 4-thread Lace Machines are shown on Plate C. No. 1—8.

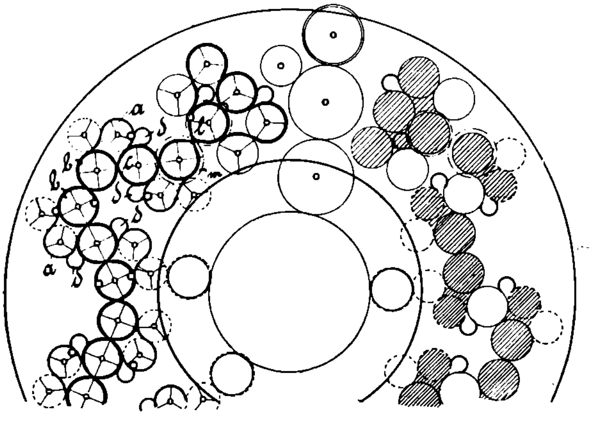

Fig. 24

The 3-thread Lace Machines are very similar to the 4-thread Machines, only the centre four-horn gear is left out in each band, as there is one thread less (see **Fig. 24**); sometimes the right-hand end-band has 4 threads, instead of 3. Samples of 3-thread Laces are shown on Plate C. No. 9—11.

2-THREAD LACE MACHINES.

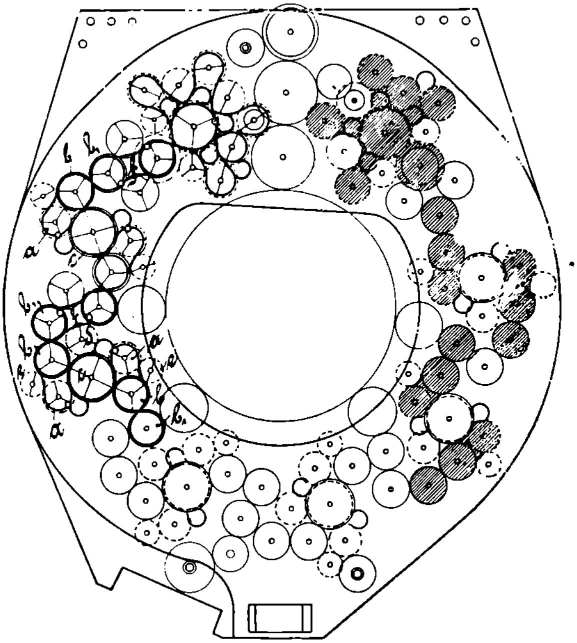

Fig. 25

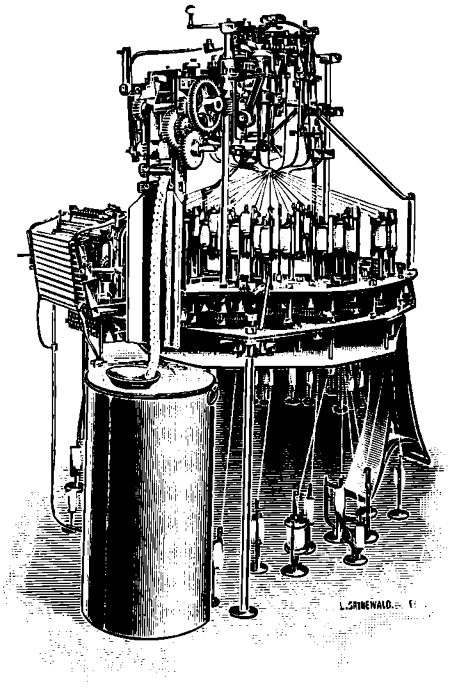

Fig. 26 2-thread Lace machine

Fig. 25 illustrates the 2-plate system. The track of each band consists here only of two plates, similar to the track of a Russia Braid Machine. The advantage of this system is that alternately the twist of the threads opens to the left and closes again to the right. The strength of the thread, based on its twist, remains therefore the same, even if the bobbin runs for any length of time in the same track.

The 2-thread Lace Machines are usually provided with 3 outrunners on the left-hand side and 1 outrunner on the right- hand side, because loops of 3 different lengths are quite sufficient for the production of good arches. If specially desired the machines can however be supplied with more or less outrunnes on both sides, but in all cases special care is taken that the speed of the spindles for the whole machine remains the same.

2-thread Lace Machines from No. 20 upwards are provided with 2 tongs. As to the formers, fluted rollers, take-up, etc., the same remarks apply to these machines as made for the 4-thread Lace Machines.

Samples of 2-thread Laces and Insertions are illustrated on Plate C. No. 12—18.

The construction of 2-thread Lace Machines is shown in **Fig. 26 and 27.**

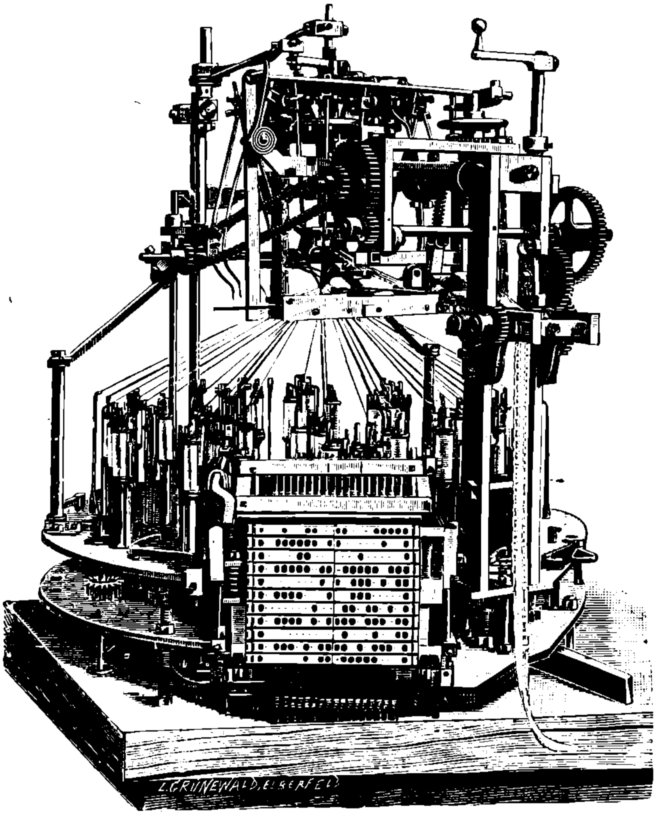

Fig. 27

2-thread Lace machine